Navy Ergonomics Program

Technical Support Services
by Naval Facilities Engineering Command

Ergonomic Return on Investment Methods

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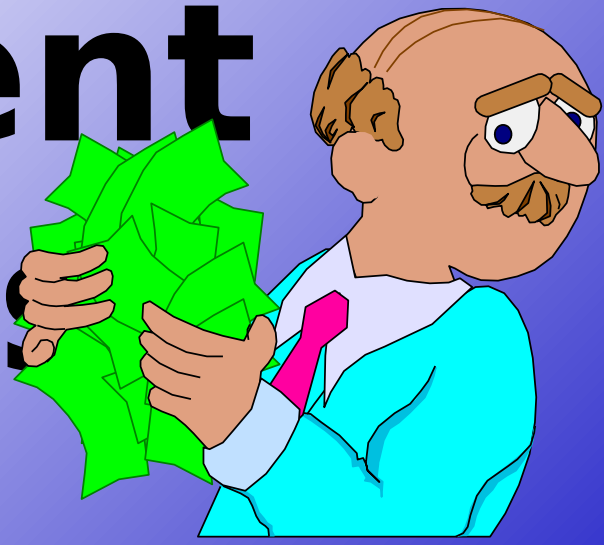

Outline

- Review the costs, both direct and indirect, typically associated with ergonomic injuries / illnesses
- Review techniques for quantifying return on investment to justify ergonomic interventions
- Share interventions successfully implement at DoN worksites

The Iceberg Theory
What Sinks the Ship?

Direct Costs = the tip of the iceberg

vs.

Indirect Costs = the rest of the iceberg

Tip of the Iceberg
What Sinks the Ship?

Direct Costs

1. Workers' Compensation & Disability
2. Lost Work Time
3. Medical Claims
4. Insurance Premiums
5. Litigation & Fines

The Rest of the Iceberg
What Sinks the Ship?

Indirect Costs:

1. Loss of Good Will, Lower Morale
2. Inefficiency Costs of Restricted Work
3. Hiring and Training Replacement
4. Overtime to other Employees because of Injury
5. Administrative Costs
6. Costs Arising from Violation or Injury Investigation / Follow-up

The Rest of the Iceberg (indirect costs) Sinks the Ship

For every **$1** expended on **Direct Costs** and an additional **$4** is expended on **Indirect Costs**

Value of Direct Cost Saving per Musculoskeletal Disorder Averted*

Value of Lost Production $14,763.
Medical Costs $ 3,080.
Insurance Administrative Costs $ 1,872.
Indirect Costs to Employers $ 2,832.

Total Savings Per Prevented MSD $ 22,546

OSHA estimates a 100% **Return on Investment** for preventive ergonomics over a 20 month payback period for most solutions

*Adopted from the OSHA Preliminary Economic Analysis and Initial Regulatory Flexibility Analysis for the Proposed Ergonomics Program Standard

How Ergonomics Affects the Navy

*Ergonomic injuries and illnesses

- Represent the single **largest** source of claims and costs to the Navy
- Roughly **$90 million annually** or one-third of all recent claims

If left unchecked, the Navy's annual cost is

- Projected to increase to **$111 million** by FY 2009

* Analyzing the Navy's Safety Data by CNA, December 2001. Based upon FECA data.

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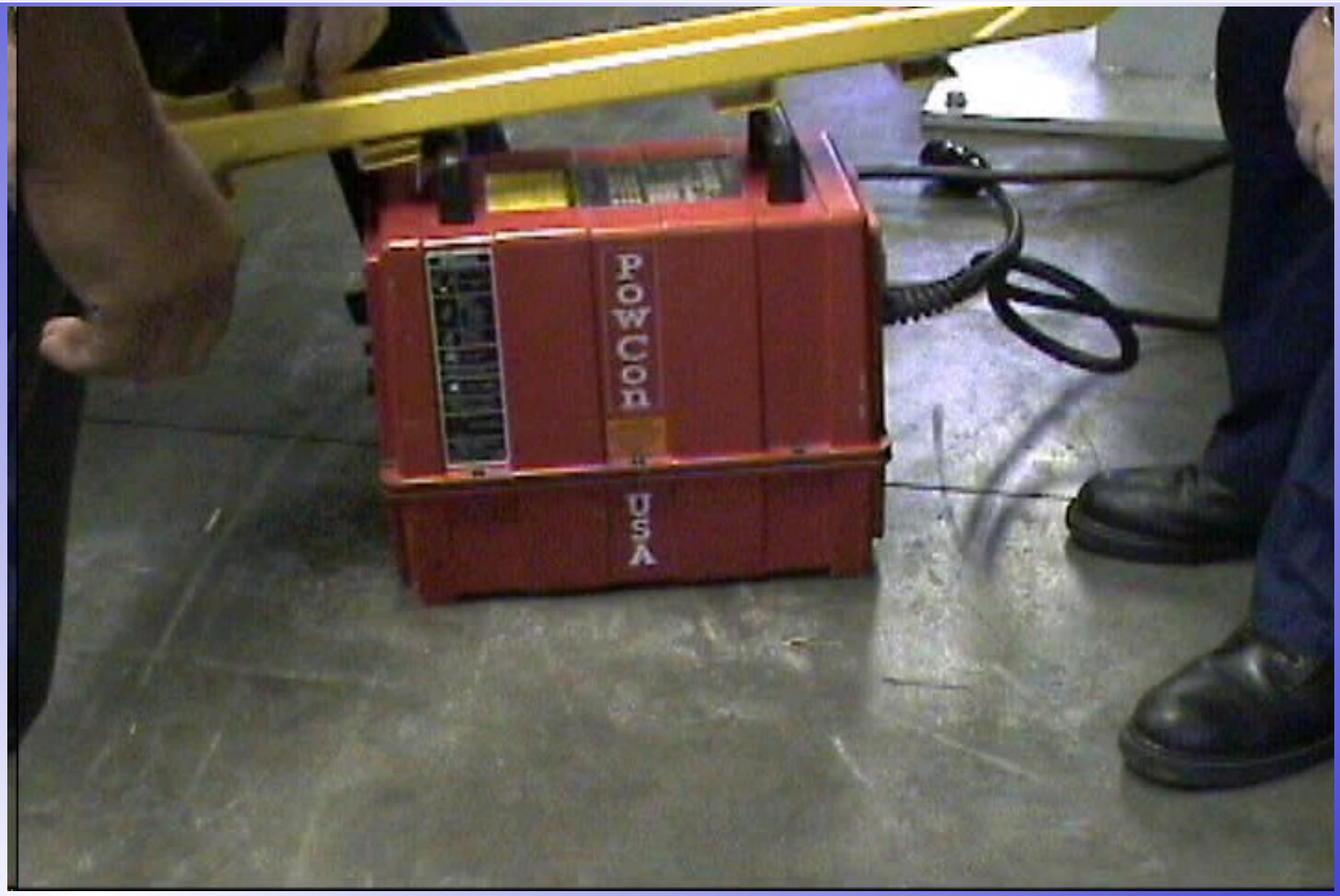
ROI Method – Potential Injury Aversion

Justification: Potential Injury $15,590 average back claim

Solution: Carrying fixture designed by shop supervisor and fabricated on-site $150 x 12 = $1,800

One adverted back injury
15,590 ÷ 1,800 =
8.6 : 1 pay back

ROI Method – Potential Injury Aversion



ROI Method - Collect data, analyze and relay information to highest levels

Managers weighing decisions expect *specifics:*

- Chargeback *totals* (5-10 years show *cumulative* costs)
- Most *frequently occurring* injury type (WMSDs)
- Most *costly* injury type (medical/compensation/productivity)
- Average *cost* per injury type per year
- Most efficient *interventions*
  - Proof that practical, low-cost intervention is successful
  - *cost per unit of ergonomic improvement = cost of intervention / number of workers helped*

You can't predict specific injuries avoided, but you **can** show increases in productivity, reduction in overall injury rates or severity, and costs

ROI Method – Intervention vs. Injury Costs

Hazards: Throwing dirty linens & trash over the side of the building, and carrying supplies & furniture up three decks

ROI Method
Intervention vs. Injury Costs

Ergonomic Intervention:
Outside 3-Story Lift = $60,50

Cost Justification:
Injury data FY97- FY01
14 recorded back injuries
Average cost of a DoN back injury $15,590
14 X $15,590 = $218,260

Intervention Cost / Ave. Yearly Back Claim Cost
60,500 ÷ 43,652 = 1.38
1.38 = **1 year 138 day payback period**

Injuries are often thought of as a cost of doing business

Evaluate Production Numbers

ROI Method – Evaluate Production Numbers

FY02 plan: 1.03 days *per worker* for anticipated injuries

1.03 lost days / worker x 156 workers = **160.7 lost days**

160.7 lost days X 8 hours / day = **1,285 lost production hours planned for injuries**

cost of doing busin

Actual figures from NADEP Jacksonville

ROI Method – Evaluate Production Numbers

Production Operation:

Actual figures from NADEP Jacksonville

Population: 156 workers

39 Lost Workdays (LWD)

39 ÷156 = .25 LWD per worker

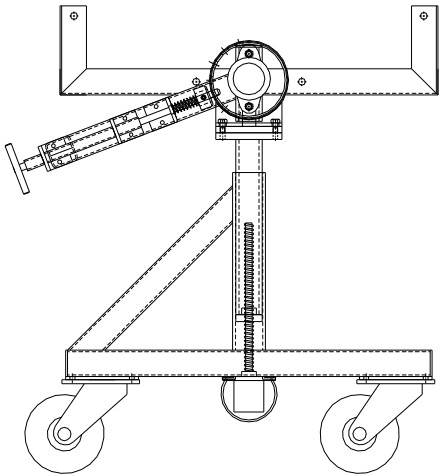
121 Alternative Production Workdays (APW)

121 ÷ 156 = .78 APW per worker

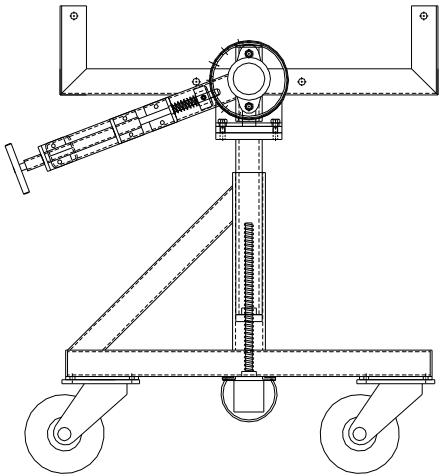
FY02 plan: 1.03 days *per worker* for anticipated injuries

cost of doing busin

ROI Method - Payback Period Based on Production



ROI Method- Payback Period Based on Production



Pre Intervention Annual Cost (15 days/door x 8 hr/day x $30/hr x 20 door/year)	$72,000.
Post Intervention Annual Cost (11 days)	$52,800.
Annual Cost Difference (savings) $72,000 - 52,800 =	$19,200.
Expected Service Life	10 years
Total Improvement cost over 10 years per worker (tools, fixture, maintenance)	$10,700.
Return on Investment (10 Years)	
Cost Savings (10 years)	$181,300.
Payback Period	**203 Days**

ROI – 10 Year Cost Savings

Improvement Cost over Life Cycle

Fixture construction cost = $5.5K

Expected Maintenance over 10 years = $1K

Tooling ($1500 x 3 replacement cycles in 10 yrs = $4.5K

Total Improvement Cost: = **$22,000**

Ten Year Cost Savings

10 X (annual cost of pre-intervention) – [improvement cost + {10X (annual cost of post-intervention}] =

10 ($720,000) – [$10,700 + {10 ($576,000)] = **$181 300**

Break Even Point

Improvement Cost / Annual Cost Savings

$10 700 / 19 200 = .557

"Ergonomics removes barriers to quality, productivity, and human performance by fitting products, tasks, and environments to people." *ErgoWeb.com*

HA Project NADEP NI

ROI Method - Lifetime WMSD Costs

What happens when work practices are not altered after and injury?

- Supervisor @ NASJAX suffers a back injury helping move sheet metal in Jan 1978
  - 1978 $1000 medical and no lost time*
  - 1992 Injury recurrence cost $18,000
  - 1993 Surgery/compensation cost $81,000
    - Resulted in permanent partial disability
  - 2001 Chargeback cost $55,000 alone

1978 back injury cumulate cost over $517,000

***Original injury cost data doesn't appear to warrant investment . . . . until "Ergo-thinking". . .**

$21K Invested in 96’
Invested in ’78 = $500,000 Cost Saving

Free-standing crane with magnetic clamp $12.2K

Roller Feed Table $1K

Metal Sheet Storage $8K

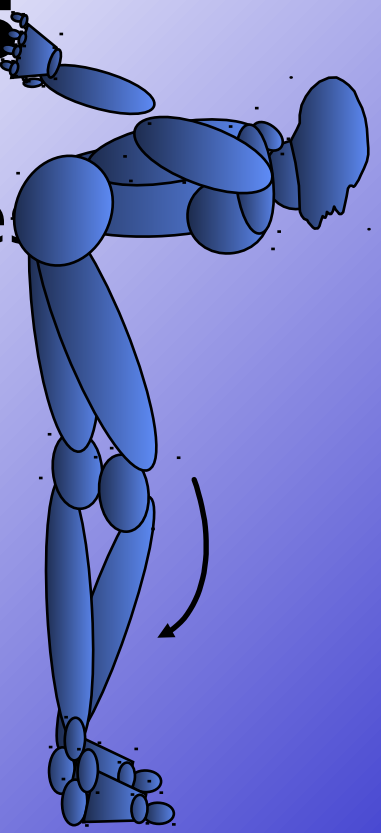
ROI Methods - Small Investment / Grand Payoff Ergo Joe Stretch n' Flex at PSNS 1996

- Displayed 6,000 posters that reminded workers to stretch and conducted awareness training
  - Initial data showed a **22% reduction** in back injuries
  - 90% voluntary participation

- Expanded Program :
  - Ergo Mentor and Ergonomic Orientation Training
    - Mentor reminds work groups to stretch and educates through better working techniques (body mechanics)
  - Trade specific solutions / Reminders with tooling
- Results 1996-2002:
  - 20% reduction in back injuries activity-wide
  - 50% voluntary participation

ROI Methods – Small Investment / Grand Payoff Ergo Joe Stretch n' Flex at PSNS 2003

- Continuous results
  - Dry dock with program averaged **5.5** injuries per boat last evolution compared to an averaged **7.7** injuries per boat without the program
- PSNS instruction (proposed)
  - Requires all employees to gather for 10 minutes at the beginning of each shift where stretching will be conducted
  - Employees are not required to stretch, just be present



Conclusion

GOOD
ERGONOMICS

Is

GOOD
ECONOMICS!